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## **Cost and Management**

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### **EDITORIAL COMMENT . . .**

## **The Thesis Requirement**

A unique requirement for admission to registered membership in the Society is the thesis. A thesis is not usually required for graduation by other professional training organizations nor is it customarily associated with the undergraduate work of a university student. "Is it worth the time and effort?" "Do students really learn anything from the experience?" "What purpose does it serve?" are questions frequently asked and, incidentally, considered by the national and educational committees.

The Society regards the thesis as the pinnacle of the student's academic growth while on course. To fulfill the demands of the requirement, the student must think and work in the manner of a professionally qualified person who knows what he is about. This point is expressed in the unsolicited words of one young R.I.A. graduate from whose recent letter we quote:

"In our estimation, the thesis requirement of the R.I.A. course is one of the outstanding features, as well as one of the greatest benefits that we know of.

We most certainly enjoyed experience in research work and thesis writing."

There are many reasons why the Society regards the thesis as a most important contribution to the professional training of graduates. Possibly a consideration of three of these will express this deep-rooted conviction.

1. To reach the high standard for thesis acceptance, students must do some original thinking on a topic of their choice. This thinking must bear fruitful relevance to the knowledge they have acquired on course and to their every day practical ex-

periences. This is a stimulating though demanding exercise. There is a definite carry-over to the role of the professional, for the ability to think in relationships is one of the most desirable of personality attributes, highly sought after by management.

2. The thesis demands that students pay much attention to expression and to mechanics. Grammar, choice of words and punctuation are the vehicles of expression. Without them, students cannot convey their thoughts with clarity, conviction and judgment. Similarly, reports, forms or other exhibits must be prepared carefully.

By evaluating the student's performance in this area, the necessity of meticulous work by the graduate is re-emphasized.

3. It is axiomatic that tasks, once completed up to a standard, are easier to tackle in the future. R.I.A. graduates, having prepared a thesis, are in an advantageous position to prepare company reports regardless of their length, the amount of research involved or whether they deal with new or old situations.

With the establishment of the new courses of the revised curriculum, particularly Report Writing, students will have an additional source of help in preparing their theses. Also the national Educational Committee is considering ways and means by which a national thesis Examining Committee can be organized so that there will be a national standard for all of Canada.

From one point of view, it would be easier to graduate students without the thesis requirement. From the point of view of the evolving role and increasing stature of R.I.A. graduates, management's expectations of a graduate's performance must be fulfilled. To this end the thesis is regarded as an increasingly important requirement and one of the major contributions to professional training.

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# STANDARDS AND THEIR APPLICATION IN COSTING\*

*By Ralph Davies,  
Vice-President,  
Urwick, Currie Limited,  
Montreal.*

In this paper, the author outlines the customary method of establishing standards for effective cost control. Distinguishing between operations subject to exact control by standards and those less so, he goes on to outline a modified form of standard control for those industries in the latter classification.

In present day business, there are two separate and distinct applications of costing. One is just plain costing, pure and simple. The other is cost *control*. Costing is usually the collection of the several costs incurred and their subsequent totalling to give the final cost of any project. To do this, standards are not required. Typical examples of simple costing are found in those industries looked upon more or less as process operations. These include the chemical industries, mining, construction, printing, etc.

This method gives the ascertainment of costs and it is thereby incumbent upon senior management to watch developing cost trends closely. Obviously, a good deal of subjective judgment is required for this, allied with an intelligent appreciation, (in many instances sheer intuition), of the day-to-day circumstances and the related decisions which need to be made to run the business effectively. Now this procedure may well have been satisfactory some years ago when businesses were run by the founder and owner who had full knowledge of the firm's effectiveness at his fingertips. Since those days, however, business has increasingly been faced with two alternatives. Either a company could maintain such methods with a high probability of eventually going out of business or it could follow the trend and delegate the several responsibilities to people with specialized knowledge and training. Hence, the subjective thinking was replaced by objective thinking.

For the objective thinking to operate effectively, it has been necessary to develop an analytical approach which can only base decisions on facts. The facts, insofar as costing is concerned, are mainly the precise measurement of time and materials in either, or both, direct and indirect services. Such a situation then is the basis of standard costing and, most important, cost control. Though the application of simple costing will be dealt with a little further on, let us now discuss how the basis of standard costing is set, that is the standards themselves. For simplicity and ease of under-

\*An address to the Hamilton Chapter of the Society given on October 16, 1958.

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Mr. Davies, who was appointed Vice-President of Urwick, Currie Limited last month, joined the management consulting firm of Urwick, Orr and Partners Limited of London, England in 1949. Seven years later he came to Canada as Senior Partner in charge of the Toronto office of Urwick, Currie. Holder of the degrees B.Sc., A.M.I. and Mech. E., he was educated at Birmingham University in England. Mr. Davies has had wide practical experience in industrial engineering gained in the internal combustion engine electrical equipment and aircraft industries.

standing, those methods will be described which are normally applied in industries where accurate measurement is possible.

### **AREAS FOR FIXING STANDARDS**

There are usually four or five main areas in a manufacturing outfit which can be subjected to the setting of standards. These are, in order of the manufacturing process and hence not necessarily in the order of importance.

- (a) the purchasing function
- (b) the direct wages of employees
- (c) the monies paid for achievement of targets. In other words, performance bonuses.
- (d) material utilization
- (e) indirect expenses connected with such items as maintenance, service operators, air and electricity, some clerical functions, etc.

So, it is apparent that there is significant scope for the application of the standard costing system in most businesses.

#### **1. LABOUR PERFORMANCE**

Taking these areas now in order of importance, let us first consider the most important area of all—the one concerning labour performance. Now (the wastage of labour, in terms of time, is most difficult to detect unless one has some means available of measuring the performance obtained against the performance which *should* have been obtained.) Loafers, indolents, and slow movers usually put up a good show when supervision is around, but when authority is elsewhere, they revert rapidly to nature. It is from this unfortunate feature that the need for incentive schemes was born, for basically any incentive scheme is merely a means to overcome ineffective supervision.

All things being equal then, the first area in which to exercise control is that of labour performance and costs.) The concern here is to determine the basic standard from which performance can be measured. Work study is the best means management presently has of accomplishing this.) Work study is an all-embracing term covering both method study and time study. Time study, again, covers the range of M.T.M. (Methods Time Measurement) and similar techniques such as B.T.M. through to straightforward time study by stop watch and time study by less accurate means, humorously referred to either as calendar studies or alarm clock studies. At this stage, however, only the application of work study by stop watch will be covered.

#### **FIVE STEPS ARE TAKEN TO ESTABLISH STANDARD TIME**

1. The present method of operation is analyzed to determine the best method. Only when the observer is satisfied that the method is the most economical in time and effort is the next step taken.
2. In step two, the method is broken down into elements. Each element should preferably be not less than 0.1 minutes in length of time nor greater than 1.0 minute. Naturally this rule cannot be strictly applied but it should always be

the objective of the observer. Elements should have distinct break points so that each element can be accurately timed.

With the elements and the respective break points recorded on the study sheet and identified by symbols, preferably alphabetic, the actual time study can begin.

3. Each element is then timed, preferably with a flick-back stock-watch. The actual time taken on each element is recorded on the study sheet. To ensure accuracy, several operations should be timed so that wide variations from average can be detected and the validity of the elapsed time checked. It could well be that wide variations have some perfectly logical cause and should therefore be allowed in the standard time.
4. During the early part of the study when the working rhythm has been achieved, a "rating" is applied against the element. This rating is the experienced observer's evaluation of the speed in which the element was executed. In our company, we normally use a rating scale based on 60 minutes of work to the hour. This is known as the "60" basis. The rating scale is in five point increments. By this means an operator's performance, if above the day-rate performance of 60, will receive a rating of, say 65, 70, 75 or 80, etc. Race-horse operators can achieve a rating of 100 or more. Substandard performance below the day-rate speed of 60 means that the rating could be 55, 50, 45 or 40, as the case may be. Speed of working less than a 40 rating is not worth studying and the attempt to fix a standard should be postponed until a reasonable performance can be expected. The technique of rating is the means whereby the speed of the operator, whether fast or slow, whether giving a reasonable performance or not, is normalized to give what would be expected of a normal operator working at normal or day-rate speed. Hence, the frequently-raised question of how one copes with different performances is answered. But, above all else, a "normal" time, fair to both employer and employee, is established. The mathematical formula for giving "normal time" is to multiply the stop watch reading by the rating over, or divided by 60.
5. Finally, consideration is given to the unalterable fact that no man can work throughout the day without stopping for some reason or other. This consideration is known as the "Relaxation Allowance". To provide for this, a basic allowance of 8% of the "normal time" is generally added to provide for personal needs and a further 2% is added if the operator is standing. Other factors such as unfavourable working conditions, heavy weight-lifting, close and detailed attention requirements and unnatural positions also qualify for further allowances if exceeding normal. Allowances usually follow the same range but can vary between companies.

With the addition of the relaxation allowance, as a percentage, to the "normal time", we then have the "standard time" for the job in question.

From this description of what is probably the most widely-used means of setting standard times, one can readily see that the targets set are achievable by average effort. It has been found on innumerable occasions that an average individual performance is around 78. Departmental performances frequently hit and maintain a 76 performance.

## **2. MATERIAL UTILIZATION**

Fixing standards for the control of materials is generally a much simpler matter. All that is needed is to determine as accurately as possible the minimum amount of material that can be allowed as scrap or waste at each operation. Unfortunately in industry today, this basic fact often goes unrecognized and uncontrolled. Management, particularly first-line supervision, is the prevalent offender in wasting materials. Materials, to their mind, do not represent any significant value in dollars.

Whereas the unit of measurement in controlling labour performance is usually hours expended, the control of materials can have any one of several measures as the unit. In certain circumstances, weight may be the unit; in others it could be volume, area or perhaps only one dimension. At other times it could be plain, straightforward dollar value.

## **3. PURCHASING STANDARDS**

Purchasing standards are fixed mainly for the purpose of measuring the effectiveness of the purchasing function. These standards can be determined by such methods as current market prices, historical data, price trends, etc. Fixed purchasing standards, moreover, assure management that efficiency or inefficiency in production is not being obscured by variations in buying prices. In other words, favourable buying prices should not benefit the production departments nor should unfavourable buying prices reflect adversely on their efficiency.

## **4. DIRECT WAGES**

The standards for direct, or basic, wages are fixed from the rates prevailing at the financial year end. By this means, increases in basic wages can be treated as an excess variance in the direct wages account, so that it is not necessary to revise all the labour standards when a new labour contract is signed. Furthermore, excess costs arising from premium payments for overtime, as an example, can be handled through the Direct Wages Control Account.

## **5. INDIRECT EXPENSES**

The standards for indirect expenses will always be peculiar to the undertaking in question. (Such things as power consumed, coal, etc. can have standards based on historical data. Maintenance expense, often heavy and in need of control, can be regularized quite effectively if certain basic steps are taken.) These basic steps include the introduction of planned maintenance utilizing measured labour standards, fixed material requirements and hence costs. Besides planned maintenance on a routine basis, another substantial part of the work done by the maintenance crew is capital work. If management has progressed sufficiently to budget for the capital work to be done, all that is required for this aspect to come under control is sound estimating. The one remaining aspect then is emergency-type work. With an effective planned maintenance procedure, the incidence of unforeseen breakdowns and emergencies is lessened considerably. However, no system yet devised by man can completely eliminate those unforeseen accidents which can, and do, happen. Therefore, a special "lump sum" allowance has to be made for such emergencies. Excess operating out-

side this lump sum allowance is sufficient for management to enquire into the effectiveness of the planned maintenance scheme.

#### **ALWAYS USE QUALIFIED PERSONNEL TO SET STANDARDS**

So there are the five major areas in which standards can be set. Before leaving this subject, one word of warning about the important area of fixing labour standards. It is this: under no circumstances should labour standards be set by *unqualified or untrained people!* This can only result in inequalities, distrust and chaos. Do not attempt, however great the need for standard costing, to introduce labour standards until a man trained in work study is available. In looking for this man, do not be fooled by the man who *says* he is a work study engineer. Many people profess such training and competence who are little more than novices attempting to break into a field where fundamental training and experience is required for a successful operation.

#### **NEED FOR STANDARDS IN LESS PRECISE INDUSTRIES**

So much for the more precise manufacturing businesses. Now let us discuss how standard costing can be applied to the less precise industries, meaning those which cannot, because of the very nature of the work, be measured quite so accurately. Two of the largest industries of this type, which will serve to illustrate how companies can operate on a form of standard costing, are the construction and mining industries. Because of:—

- (a) the high selling price,
- (b) the high labour content and
- (c) the widely variable methods of operating wherein it is virtually impossible to lay down detailed methods of working,

there is a great need for cost control in these industries. Every day, evidence is presented of buildings costing much more than originally estimated. Yet the construction and mining industries are probably by far the most backward industries in Canada in adopting those recognized, tried and proven, management techniques which have been accepted by other industries. The importance of economical operating through cost control is not just confined to companies in a given industry but applies to the nation as a whole. For Canada's economic prosperity depends largely upon the basic industries such as mining. Hence management should recognize their full obligations to the shareholders, the employees, the community and the nation and introduce cost control techniques to assist them in running the business on an economical basis.

My company is very busy at the present time with nationally, if not internationally-known companies, in introducing cost control techniques. To describe how this is done, the construction industry will be used here as an example. At the same time, the following remarks will apply to some extent to mining because of the similarity of operations in the two industries. To paint the true picture of normal present-day practice, it will be necessary to give some idea of how most construction companies attempt to control costs.

#### **PRESENT CONTROL METHODS IN CONSTRUCTION**

The contractor's operation starts with submitting an estimate for a job. Contracts are usually awarded to the contractor submitting the lowest bid. Hence the accepted

estimate is really the contractor's selling price. An important point to note is that a company is doing well to have one estimate in eight or ten accepted. Because of this, each and every estimator resorts to recognized practices that will increase the ratio of acceptance. Perhaps the most prevalent practice is that of estimating on the heavy side in operations where an "extra" might be asked and putting light prices to those operations where there is little likelihood of an extra arising. Similarly, the "mark-up" can be set according to the contractor's assessment of "what the traffic will bear." Sometimes no mark-up at all is added in the hope that extras will provide the profit. It is obvious then that the estimate is an unreliable basis for measuring effectiveness. Yet this is actually the modus operandi of most construction outfits. In fact, the customary practice when a contract is awarded is to delegate a foreman to begin work. Just like that. Even though the contract is worth several million dollars. Then the foreman, armed with knowledge of the estimated price, sets to work. "Control" consists of the foreman submitting percentage completion reports to top management. The expected profit margin is then calculated based on the amount of work estimated as being done. When a contract is in the early stages, optimism prevails in the contractor's camp for the profit margin seems quite healthy. But as work progresses, it is often found that the percentage completion follows a peculiar but consistent pattern of an inverse hyperbolic curve. In other words, as the estimate of percentage completed increases, the percentage completion stages, once in 10% increments, decrease to 5% increments at around 70% complete and thence to 2% and later 1%. Until, when the percentage completion is in the 90% range and the original optimism is being confronted with the cold, hard light of truth, the increments reduce to 1/2% or even zero. And yet the working force remains constant. Consequently a once-rosy picture of a reasonable profit margin frequently turns to gloom and despair as the anticipated profit becomes a certain loss.

It also happens that the performance of a foreman is judged on the profitability of a contract. A man whose contract makes a profit of \$20,000 is a hero, while another whose job loses \$10,000 is a clot. But in the first instance, the estimate might have yielded a \$50,000 profit and the foreman has, in fact, lost \$30,000. So to judge a foreman on results against is grossly unjust, particularly when one remembers that the estimator in the first place may have introduced varying prices to suit anticipated conditions in order to have the contract awarded to his employer. So there is, apart from the national and company need, a sociological need for a more equitable system of measuring performance. For the solution to this problem, we turn again to standard costing. Not in the pure form discussed earlier, but to a modified application which, unmistakably still, recognizes the basic principles of standard costing.

#### CONTRACT PLANNING

The practice which has proved so successful in both mining and construction enterprises is that of contract planning. The procedure is carried out as follows—

1. Firstly, as soon as the contract is awarded, the executives most closely connected with the new project, but not the estimator, meet to discuss the project.
2. This meeting breaks the overall project down into smaller, yet readily identifiable operations. For a normal structure these operations, which include the sub-contracting trades, will number between 33 and 42. The estimate or selling price is not used at all to influence the work of this planning function.

3. From this breakdown, considerable care is taken in the determination of
  - (a) the man-hours required to complete each operation to be carried out by the company
  - (b) the materials required
  - (c) the equipment and machinery requirements.
- This information is then plotted on a Gantt-type chart in normal operation sequence.
4. Then the overall time limit is considered; the operations listed are adjusted accordingly so as to fall in within the required finishing time.
5. From the adjusted operations, which are now on a time base, it is a simple matter to calculate the crew labour strength for each operation. Obviously some adjustments will still have to be made to give the most economical plan for the contractor.

This then is the Contract Plan. From the knowledge of the operations and the related crew strengths, both the labour and material contents can be determined for each operation and sub-operation. The totals of these costs, plus the equipment and machinery charges, represent the direct cost of the project. Comparison of the direct cost can, at this stage and not before, be made against the selling price. The difference is of course the gross margin. It is against this planned cost that the effectiveness of the foreman is measured. The most beneficial aspect of this procedure is that the progress of work done is not left to the inspired opinion of an optimistic foreman. Instead, because of the breakdown into smaller operations against a time and hence man-hour basis, plus the knowledge of actual materials used, the percentage completion can be determined accurately. With accurate knowledge of the amount of work done and hence the remainder outstanding, the potential profitability is under control, not only before work starts on the contract but also at fixed intervals throughout the life of the job.

#### **APPLICATION IN MINING AND OTHER INDUSTRIES**

The same basic approach and principles are used for mining operations. It has been proven, time and again that, once the planning executives have been trained to analyze the job, the degree of accuracy obtained in fixing performance targets is really remarkable. Jobbing work can be handled similarly despite the often expressed theory that it cannot be adequately controlled.

What about those industries dependant upon machine utilization, where the speed of production is fixed by the machine manufacturer? Printing is as good an example as any. Here the basic need is to maintain a high machine utilization, for the equipment is only earning money when it is producing. With high machine utilization as the main objective, it is important that the time spent on non-productive operations, such as preparation, setting-up, cleaning down, inspection, handling and so on, is kept to a minimum. Now this is the area where analytical studies should be made to eliminate or reduce these expensive non-productive processes. And do not overlook the possibility that some of this work could be done during the productive cycle. This will mean having all the required materials, tools, and equipment readily at hand. Once economical methods have been established, one is in a position to fix standards.

One last aspect which should be mentioned is how the necessary control is applied. The main point to emphasize here is the importance of setting up control accounts

for clearly-defined cost centres with the responsibility for controlling costs invested in one person and one person only. A split responsibility between two or more persons can only create difficulties. With the control accounts set up in this manner, it is the cost accountant's responsibility to ensure that the cost statements pertaining to the appropriate cost centre are issued to the person responsible for incurring the costs with a minimum of delay. If there is a time lag, the ability of the responsible supervisor to take quick action on excess costs is seriously hindered.

To conclude this paper, here is a summary of the main points:—

1. The great need in industry today is not just for costing, but for cost control.
2. To control costs, a *factual, equitable* means of measuring labour performances, material utilization, machine utilization and the related services must be used. The best means available is the use of standards for each activity. And do not forget that standards in some form or other can be determined for most industries. But do make sure that the standards are *right*.
3. Make sure that each cost centre is the clear, undivided responsibility of one person.
4. Speed of reporting performance is vital. Delay can only encourage ineffectiveness.
5. Realize that there is almost always an answer to a problem. Get the facts and the answer suggests itself.

Finally, do not minimize the role of the cost accountant. If he is operating a system of cost control, the effectiveness of the whole company revolves around him. It is therefore incumbent upon him to be both accurate and fast in the presentation of reports to management. As the real centre of the company's operation, the cost accountant will find the satisfaction of his job a reward in itself.

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### McGILL TO HOLD EXECUTIVE DEVELOPMENT COURSE THIS SUMMER

McGill University will hold a four-week executive development course this summer from May 25 to June 19. The course is designed to help middle management men attain their full growth potential by acquainting them with broad problems of corporate administration outside their own particular specialties.

In developing the specialist into a "generalist", four executive areas will be covered: finance, marketing management, business policy and human relations. These subjects will be presented with a view to familiarizing participants with problems and principles in each of the areas concerned and their effect on the development of the firm's overall policy.

Through lectures, case studies, seminars, conferences with faculty members and informal discussions, the participants representing many executive positions in both large and small industries, will be able to exchange information, ideas and experience on common business problems.

Further information on the course can be obtained from Prof. W. H. Pugsley, Director of the Executive Development Program, Purvis Hall, McGill University, Montreal.

**LOOKING AHEAD**

*Smaller cars are coming.* The Big Three will produce and show small cars this Fall. Sales of imported cars are rising while total sales of U.S. cars have been dropping.

- The cars will be small but plush; automatic transmissions and power steering will be available; wheelbase will be about 108 inches and weight about 2200 lbs.

*A recent study on business districts* of big cities shows that the central business section will remain alive for years. Office activity is the key. Financial institutions, central offices of manufacturing, transportation and utilities will provide an active core of business life.

- Elite functions, the desirability of eating at posh clubs, convenience in meeting clients and personal contacts with each other keep the head offices of large concerns in the centre of the city.

• The belt around the central section extending to the suburbs is doomed according to the survey. Middle-means groups, historically, have moved outward. In their wake followed lower income groups and so on until slums were developed.

*New computers* will make the present models look like a product of the horse and buggy era.

- Automatic programming and the use of parallel machines will produce information roughly 20 times as fast as at present.

• Foreign languages, and notably technical Russian, will be translated far faster than by human means. Nuclear physicists will determine with precision the behaviour of particles. Coded information will race through the machines at the rate of two million or more pulses per second to solve intricate business problems involving product distribution, manufacturing schedules and cost-volume relationships.

**ON THE PERSONAL SIDE**

*Working under heavy emotional pressure* may be inviting a heart attack. Heart attacks and related ailments account for nearly half of all deaths attributable to heart failure. There is still some split of opinion by medical men, but more and more believe that businessmen in their forties and fifties who drive themselves hard at the office and fail to break the emotional tension on evenings and weekends are very susceptible.

- Studies on coronaries seem to show that job stress is more significant than family history, high fat diet, obesity, amount of tobacco consumed or amount of daily exercise.

*Alcoholics* number about 200,000 in Canada at the present time. This is a higher proportion than in England or Australia but lower than in the U.S. and France.

- In 1871, the amount of pure alcohol consumed was 1.19 gals. per head. Today, the figure is better than 1.5.

- In 1871, the usage showed 81% in spirits, 15% in beer and 4% in wine. Today's consumption shows 64.5% beer, 30% spirits and 5.5% wine.

An *earthquake map* of Canada, prepared recently, shows that the St. Lawrence Valley and the B.C. coast are vulnerable. Perhaps you should think about insurance. Frame dwellings are less likely to be demolished than masonry, which of course crumbles under tremor.

#### OF GENERAL INTEREST

*Electronic mail sorters* will be installed within three or four years at 15 to 20 of the major post offices in Canada.

- The electronic letter sorter has been under experimentation in Ottawa since 1955 and has proved to be a success.
- Ten letters a second can be handled by a code translation of the address. Business firms can speed mail handling by coding the address themselves.
- 3.9 billion pieces of mail were handled in Canada last year. The present system of sorting into city, then into postal zones, then into carrier routes is fast becoming an intolerable burden on the memory of the sorter.
- \$25 to \$30 million worth of segregators, sorters, computers, facers and coding machines will be needed initially.

#### PLANNING THAT NEW PLANT?

Here are a few tips from the experience of others:

- Avoid cost plus contracts and escalators, and get back to firm bids.
- Select a reliable contractor and then have your own engineers check all work in progress.
- Keep a tight rein on the architect. Don't let him build a monument to his own artistry. Also there are many standard designs available that need no architectural effort. Some of these plans may suit your purpose.
- Make sure specifications are clear and understood before signing the contract. Your lawyer should prepare special clauses. He may find also that the standard printed forms are not particularly desirable and need to be redone.

Keep in mind the future as well as the present in planning for handling and storing equipment.

The new *Federation of the West Indies* has remarkably similar problems to those faced by Canada 92 years ago at Confederation.

- Population about three million.
- Great distance between centres. Jamaica is about 1,000 miles from the nearest Federation neighbour.
- Little or no industrialization.

The ten islands in the group bought \$40 million worth of goods from us last year and sold us over \$50 million worth. We bought mainly sugar, aluminum bauxite, molasses and rum. We sold them flour, fish, lumber and a great variety of small items. We have been trading with the West Indies for 250 years.

# LONG RANGE PLANNING - AN APPROACH TO LEADERSHIP

*By Gerald G. Fisch  
and Dean L. Jacoby,  
Payne-Ross Limited,  
Montreal, Quebec.*

More than ever today, the dynamic forces molding our economy call for an equally dynamic vision, if management is to cope with tomorrow's business demands. Long range planning provides the insight into coming business conditions and their effect on company operations which every manager must have if he is to keep on making the right decisions. This article outlines some basic facts about long range planning.

**T**HE importance of leading has never been greater than it is in the business world of today, and there is every indication that being first, in a business sense, will continue to be among the foremost objectives of the successful businessman of tomorrow. To do this—to be first—businessmen must anticipate long-range trends and avoid "crisis management" based on spot decisions, inadequate knowledge and strictly intuitive judgment.

The current emphasis on advance planning has been occasioned by the dynamics of our society, spearheaded by three forces which many sociologists believe are transforming our "Age of Production" into an "Age of Consumption." These forces—an inflationary economy, an expanding population, and a dynamic industrial technology—are causing, and will continue to cause changes in our life and way of living of which we can catch only glimpses at present. The company which catches the "biggest glimpse" first, so to speak, and does something about it, will be the company first "off the mark" in adapting to the new requirements . . . and Long Range Planning is a technique of doing just this.

## SPECIFICALLY, WHAT IS LONG RANGE PLANNING?

The term itself requires no definition, and indeed, it is the rare businessman who today does not think that he is deeply involved in planning for the future, although, paradoxically, it is the exceptional company which actually has a formal long range plan in effect.

Long Range Planning, or LRP, is not merely a new term for something that business has been doing for a long time. Instead, it comprises a continuing program of establishing corporate objectives over the long pull, a program which must be re-

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vised and projected forward annually to adjust to actual operating facts. LRP is the product of the entire business organization, and it works best if members of the planning group represent various departments within the company. Furthermore, a good LRP will produce specific operating programs for each department of the company, a necessary development if the overall corporate objectives are to be achieved.

#### **HOW IS LRP DIFFERENT FROM FORECASTING?**

First of all, it is necessary to define the term "forecasting" in relation to "LRP".

Forecasting is the *projection* of future business conditions and company performance over the short-term from historical relationships. Forecasting per se does not include the function of altering company policies to take advantage of, or protect against, projected business conditions—although important management decisions may result from the forecast. It is, as the dictionary says, to "foresee" or "predict", and as a technique, it lacks the innate function of *acting* to affect the course of company progress.

This is the vital difference between true LRP and the planning which many companies do today. LRP is the activity which systematically sets the long-term goals for the firm and then works backwards from these goals to formulate the imaginative plans needed to achieve them. Although, in the final result, the LRP must balance out with short-range trends, (e.g. the LRP must be capable of accomplishment within each short-range step) initially the goals of LRP are determined independently, free from the influence of current business. As a formal plan, it recognizes the short-term effects of economic trends and pressures on business, yet it looks beyond short-range fluctuations to the long-range effects on company business.

It is possible for a forecast to indicate action contradictory to that indicated by a long-range plan—for example, during a period of business fluctuations, LRP might indicate a constantly expanding demand while a short-range forecast might show an impending downturn.

In such a case, management would require that further studies be made to assess the extent or seriousness of the expected decline. The important point is that while the forecast, if used alone, might cause management to curtail production, a conflicting LRP would indicate the need to look deeper into the situation.

Utilizing further information, management might estimate the downswing to be temporary in nature and isolated in its significance. It could then be more advantageous to continue production so as to maintain or strengthen a competitive position following the return to normal sales levels. Such answers vary widely in both solution and results, a situation which serves to point out both the nature and the need for LRP.

Forecasting, as it is generally practised, is the function of a relatively small group of people within a department, working in an isolated position from the mainstream of company policy. Their function is clear cut: given the present competitive position of the firm, what will sales performance be over a limited period in the future? The results of the group's study may be a factor in causing management to amend or change policies in order to protect against, or take advantage of, short run effects, but these will not constitute new objectives for the firm.

LRP inherently provides objectives for the company and requires the establishment of specific ways and means for their accomplishment. It does this, when in full operation, through pooling the combined knowledge and abilities of a diversified group within the corporation. Although the actual planning group will, of practical necessity, be small, it should represent members of many different departments.

In short, LRP is the synthesis of corporate goals and the means of achieving them, while forecasting is short-range projection of corporate sales objectives.

#### **WHY LONG-RANGE PLANNING?**

What are the advantages of LRP? Why should a company embark on the long and possibly tedious process of developing a plan?

There are both direct and indirect advantages. Specifically, the direct advantages include the following:

1. LRP delineates the requirements for maintaining or enlarging a competitive position within an established market. This could include the necessity for diversification as the projection indicates an old market that is shrinking, or specialization in the case of an old market expanding.
2. Requirements for additional capital, and timing, are clearly indicated.
3. The need for specific personnel will be apparent in sufficient time to recruit or train efficiently.
4. A stable base on which to plan current operations evolves with the result that short-term fluctuations do not color operating decisions out of proportion to their overall importance.
5. A systematic means of keeping abreast of dynamic markets is provided, which is particularly important in consumer-oriented industries.
6. Overall market objectives are tied to specific production, research, finance and sales plans, with a resulting balanced effort among departments.
7. A vehicle for the objective evaluation of company progress is provided through the periodic analysis of company strengths and weaknesses.
8. LRP can be used as a means of pretesting plans and proposals, a device which is particularly important for companies endeavouring to outdistance the general economic growth.

This list covers the major advantages, although it could be multiplied in almost endless fashion. All of them are oriented towards the reduction of "crisis management" through the establishment of specific operating plans to achieve long-range objectives.

There are, in addition, important indirect benefits or by-products inherent in the planning process:

1. It crystallizes executive thinking on future company operations and provides a focal point for systematic collection and evaluation of such thinking.
2. It serves to keep top executives in all departments informed of developments and problems in non-related areas.
3. It helps to locate the "blind spots" in company operations.
4. It provides a useful testing ground for such new business techniques as operations research and linear programming.
5. The planning group provides a valuable training ground for promising junior executives and acquaints them with company operations as a whole.

## **WHAT ARE THE STEPS OF LRP?**

There are as many different approaches to planning as there are people and organizations involved in planning. Out of the welter of plans, however, eight steps emerge which broadly define the process. Whatever titles are finally assigned them, the following are the essential functions of LRP:

*1. Establish overall corporate philosophy and overall goals:*

Establish a business philosophy as an overall guide for future operating decisions, and determine the overall goals. Such goals should be detailed enough to include total net sales, return on investment, profit as a percentage of sales, and growth rates as a percentage of the Gross National Product.

*2. Appraise objectively the current position in terms of company strengths and weaknesses:*

Determine objectively where the company stands at present as a base for orienting required future actions. Analyze the areas of strength and weakness within the company in order to take advantage of the strengths and to minimize and correct the weaknesses. Objectivity will not be achieved by asking each department head to evaluate his own department. Usually an independent group capable of absolute objectivity in its evaluation will be required to make a formal review at least every five years.

*3. Study internal and external factors affecting corporate operations:*

Evaluate changing technological trends to appraise opportunities for new products. Take into account changing consumer attitudes. Review opportunities to realize economics in distribution and warehousing if possible. Consider every possible factor which could be an influence on company business.

*4. Determine the general direction of future growth, considering all possible alternatives:*

Analyze the possible avenues of growth and determine the requirements of each in terms of manpower, capital and timing. Study advantages and disadvantages of every possible alternative. Select the most advantageous approach on the basis of individual company specifications and requirements.

*5. Evolve the plan as a whole in terms of specific targets and specific means of accomplishment:*

Have the end result culminate in a plan which is complete in every respect, representing the balanced effort of all departments in the company, and giving due consideration to all known and assumed external factors and conditions.

*6. Define the master plan and time table:*

Draw it out in specifics and put it down in black and white. List the salient points necessary to attain the enumerated objectives so that the LRP becomes a tangible instrument on which future plans can be based and compared. Assign pertinent dates for accomplishment of goals.

*7. Implement the LRP through active departmental short-range plans:*

Develop specific implementation plans by departments indicating the principles but retaining flexibility on details, calculated to achieve the objectives of the LRP over a specific length of time. Take steps to insure that departments are actively using such plans.

*8. Establish an effective control system:*

Develop a control system and actively utilize it for measuring and reporting deviations from the plan for executive remedial action. Periodically, review and extend the LRP. Make adjustments in the plan as conditions change and as assumptions are found to be correct, or relatively more or less important.

A balanced LRP should include enough basic facts and intelligent, clearly defined assumptions to support each part of the plan. A plan which is not based on a thorough and competent analysis of *all* available facts is incomplete and not necessarily a better solution to operating problems than old-fashioned, "seat-of-the-pants" management.

**HOW DO YOU EVALUATE LRP?**

The value of a specific plan for management can best be measured by asking the following questions:

1. Are the basic facts adequate and complete enough to support each phase of the program?
2. Do the conclusions reached represent the logical result of the application of all available data to meet the desired objectives?
3. Is the rate of growth adequate in the light of broad corporate objectives?
4. Are the return on investment and profit levels adequate over both the short and long range?

The LRP must be a practical document, based on objective reasoning. On the one hand, a plan could indicate a handsome return on investment at a favorable sales level; but, if it were not prepared objectively, taking into account the possible reverses which could occur, it would be meaningless. Management needs an effective guide to evaluate the actual planning function.

One firm of management consultants, long advocates of LRP, have evolved just such a guide for their own use, in the form of the following six questions:

1. Has the planning team determined the key factors in the growth of the industry and evaluated the influence of each?
2. Have the strengths and weaknesses of the company been completely, accurately, and objectively evaluated?
3. Were the present and projected future capabilities of each corporate department properly evaluated?
4. Is there a practical time table?
5. Have alternatives been considered?
6. Are there provisions for future reverses?

If the answer to any of these questions is "no" or a qualified "yes", it indicates that the LRP is in need of still further development by the planning group. Conversely, affirmative answers to all six questions insure a workable plan insofar as any evaluation can insure it. It only remains for management to assure itself that the original corporate goals accurately represent the picture of the corporation envisioned by management for the years ahead.

**WHO SHOULD DEVELOP THE PLAN?**

There are no stereotyped rules to follow in the organization of the actual planning group, for each company should utilize the individual advantages inherent in its own

organization. Past experience, however, indicates two specific areas which are crucial to the successful accomplishment of any LRP.

1. The planning group should be drawn from within the company organization. The use of consultants is best confined to a staff or advisory position, and to specific studies and information-gathering projects, particularly in the initial or experimental stages of LRP. The final plan itself will be more readily accepted if it is assembled by company personnel.
2. Members of the group should be of diversified background and interest, and no one department should be allowed to dominate the investigation and formation of the plan. This is an important aspect of insuring objectivity.

Practice varies from company to company concerning the final choice of personnel for the planning group. The chairman should be a ranking member of top management, both as an indication of the importance of the plan to management and of top level support for the planning process. On the other hand, key junior executives, who are unusually objective and incisive in their thinking, can also play a vital role in the planning group.

It goes almost without saying that the group should be authorized to draw upon any department or group within the company as specialized skills or knowledge are required.

#### **HOW DO YOU MAKE LRP WORK?**

Once the lengthy process of developing a plan is completed, what assurance does management have that the plan will work? How does management insure that the LRP will be a living instrument, and not just a "confidential report in a locked drawer?"

A significant way of testing LRP, and convincing personnel that it actually will work, is to try it out in the form of a tightly controlled "pilot plant" operation before committing the company to the full program.

For the pilot run, there must be cross-checks and duplicate sources of information to insure the accuracy of the plan. All possible alternatives must be considered and tested. Here outside groups are used freely to test and corroborate the work of the internal groups. The pilot run when finally ready for use must be as foolproof as human effort can make it.

LRP, of course, needs the support and genuine enthusiasm of top management. Once confidence has been established and top management's enthusiasm has become apparent, the word will spread quickly throughout the organization and the plan will be given a chance to produce.

#### **RESEARCH AND DEVELOPMENT AND LRP**

LRP is a valuable management tool for measuring the effectiveness of research and development programs, and for pinpointing specific tasks for the future.

Planning such a program is, of course, an obvious function of LRP; nevertheless, it should also be used in the inverse sense as a framework for evaluation at periodic intervals throughout the length of the plan. It has the advantage of permitting a tight integration of research and development effort, and as such, plays a major role in the accomplishment of long-range corporate objectives.

### **IN CONCLUSION:**

LRP in business is, in many regards, analogous to sailing. Even in the days of square-rigged clipper ships, the captain knew something of the prevailing winds and currents between his home port and port-of-call; he had a rough idea of the prevalence of storms at the time of year he put to sea. From this, and from as many other sources of information as could be gathered, he established his course, took on supplies sufficient to cover any contingencies that might arise, and finally, upon hoisting sail and preparing to leave the harbor, he took note of the wind direction and set his sails to get the maximum performance from his ship, holding as close as possible to the course required to reach his goal.

The businessman who has no plans for the future is like a captain sailing dead before the wind, without a firm destination, and short on provisions—helpless before the caprices of a changing wind.

Management today is required to make decisions having far-reaching effects on future business success, in a business environment which is in a constant state of flux. Yet, many executives make such decisions without the benefit of insight into coming business conditions or their requirements on company operations.

Long-Range Planning is a technique which provides just such insight; it can help determine when results are "off course", and assist in trimming sails to achieve maximum performance.

#### *For further reading*

STEPS IN LONG-RANGE PLANNING, by Bruce Payne, Harvard Business Review, March-April 1957.

PRETEST YOUR LONG-RANGE PLANS, by William J. Platt and N. Robert Maines, Harvard Business Review, Jan.-Feb. 1959.

HOW MANAGEMENT TACKLES ADVANCE PLANNING, Management Methods, January 1958.

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# The Economic SCENE . .

by W. Allan Beckett

## THE ROLE OF THE BANK OF CANADA

SOME time during March, the Governor of the Bank of Canada will have presented his Annual Report to the Minister of Finance. Among other things the report will review major developments in Canadian business in 1958. The Governor will describe the effect of economic events on the Bank's operations and the influence of the Bank's operations on business conditions. In short, it will describe and analyze the role of monetary policy in our economy and for this reason it should be of great interest to readers of the *Economic Scene*.

The Bank of Canada is charged with responsibility "to regulate credit in the best interests of the economic life of the nation, to control and protect the external value of the national monetary unit (the dollar) and to mitigate by its influence fluctuations in the general level of production, trade, prices and employment." In addition, the Bank acts as the fiscal agent of the Dominion Government. This latter aspect will receive much attention in this year's report as a result of the huge Conversion Loan of 1958.

However, it is the Bank's role as monetary manager that is of greatest significance. In "mitigating fluctuations" in general business activity, the Bank can and does affect overall conditions, and these affect us all. More specifically, monetary policy acts through the supply and demand for money and changes here are reflected in 'tight' or ample supplies of money and in variations in interest rates.

From a cost point of view, monetary policy is important in so far as its effects are revealed in changes in the cost of credit to finance inventories or receivables.

The report for 1958 will describe the changes that occurred in the money supply—a gradual growth during the earlier part of the year, a sharp increase when the Conversion Loan was being floated and further slow growth to the year end.

Accompanying the expansion in the money supply, the report will note a decline in interest rates, until mid-year, particularly the yields on government Treasury Bills by which the Treasury finances day-to-day operations. The Bank will take some credit, and rightly so, for these changes, and point out that it was attempting to mitigate the decline in activity that was underway in 1958. The Bank will also take some just credit for cushioning the impact of the 1957-1958 recession and for helping to get it turned around.

At the same time, the Governor will regard with a jaundiced eye the continuing rise in consumer prices during 1958. This will be emphasized as evidence of the continuing danger of potential inflation, and readers will be forewarned (it is to be hoped) that the Bank will take stern action to check inflation in the coming year. This will be coupled with an admission that monetary policy cannot be expected to bear the full brunt (or blame) and a plea that business and labour conduct themselves in such a fashion that further serious inflation can be avoided.

Readers interested in more recent trends might note that the expansion in the money supply halted early this year, and that interest rates have been rising sharply since July 1958. Treasury bill yields, for example, have risen to a level of 4.07%, just below the all-time peak of 4.08% in August of 1957 during the so-called 'tight' money period. Many observers attribute the prevailing rate directly to the Bank's action. Press reports will note that the Bank of Canada set the rate as such-and-such a figure.

This is both unfair and untrue. The Bank of Canada does operate in the money market by buying and selling bonds and by extending and withdrawing credit (the latter to a limited degree). But so do many other institutions and individuals. So it is the laws of supply and demand that are really operative. The Bank can influence the trend in interest rates, but only in small steps. And, returning to the beginning of our story, the Bank leans against the trends in the interest of promoting the general economic welfare by attempting to choke off inflation and by pumping up recessions.

Of course, monetary policy is not the only means of achieving stability and growth. Governments can also use fiscal policy, or cyclical budgeting. This simply means that the government taxes us for more than it spends, runs a surplus in good times; and spends more than it takes in, or runs a deficit during bad times. The Government's surplus is money that businesses and individuals cannot spend to drive the economy faster toward inflation. The Government's deficit returns money to the spending stream to bolster it when it is cut by poor sales and unemployment.

Together monetary and fiscal policy can help us to walk close to the razor's edge of full employment without inflation. They never work perfectly, of course, and even when they do, some of us get hurt in the interests of promoting the common welfare.

As the current business expansion gathers momentum we should prepare ourselves for the return of a Government surplus and for steps by the Central Bank to curb expansion in the money supply. This will mean scarcer and more expensive money. Some of us won't be able to get enough. While this may hit us pretty squarely in the wallet, the alternative of inflation could conceivably burn out the pocket too.

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# INCOME TAXES APPLICABLE TO THE OIL AND GAS INDUSTRY IN CANADA\*

*By B. C. Tanner,  
B. C. Tanner & Co.,  
Edmonton, Alberta.*

In this article, the manner in which the oil and gas producing companies in Canada are taxed is discussed. The relative tax positions of the Canadian and American investor in oil are compared and the advantages of Canadian vs. American oil investment are weighed.

**O**IL and gas producing companies operating in Canada are taxed on a basis commonly known as the "cash receipts and disbursements" basis. This method of computing taxable income is usually considered applicable only to farmers and fishermen.

## WHY DO I SAY THIS?:

- (a) Each is taxed (with certain minor exceptions) on receipts only.
- (b) Each is permitted to expense for tax purposes all costs (also with certain exceptions) except the cost of land<sup>1</sup> and machinery and equipment required to be capitalized.

I have not, and do not intend to say, that the manner in which producing oil and gas companies are taxed is unfair. The Canadian system of applying income taxes to oil and gas companies is not unlike that enforced in the United States. And, it is possible that it was necessary to extend incentives of this nature in order to obtain risk capital to undertake the tremendous expenditures necessary to explore for and find our reserves of oil and natural gas.

I did say however, and I intended to say, that producing oil and gas companies are taxed on a basis comparable to that commonly described as the "cash receipts and disbursements" method—and that the "cash receipts and disbursements" system on which producing oil and gas companies are taxed may be considered to be even more favourable than the method of taxing farmers for a number of reasons—two of which are:

- (1) Oil and gas companies are permitted an allowance (which will be dealt with later) that is commonly referred to as a depletion allowance and—
- (2) A farmer is required to capitalize improvements to his land—an oil and gas company may expense improvements and, in certain circumstances, may expense the cost of land itself.

\*An address given before the Edmonton Chapter of The Society on December 10, 1958.

<sup>1</sup>Petroleum and Natural Gas Rights are commonly referred to as land cost.

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The author, who heads his own firm of B. C. Tanner & Co., has had 11 years of practice as a Chartered Accountant. On graduation from Mount Royal College in Calgary, he articled for five years to the firm of Peat, Marwick, Mitchell & Company, completing his Chartered Accountant's course through Queen's University. He was awarded the 1956-57 Sloan Fellowship at the Massachusetts Institute of Technology, obtaining his Master of Science degree in Industrial Management.

Section 83A of the Canadian Income Tax Act<sup>2</sup> provides, briefly, that a corporation whose principal business is the production, refining or marketing of petroleum or petroleum products or natural gas, may deduct all drilling and exploration expenses in the amount necessary to reduce income to "nil", and it may carry any unabsorbed balance forward to reduce succeeding years' income to "nil"—until such costs are fully absorbed. And, in order to fully understand what this means, one has to know that drilling and exploration expenses are generally taken to include administration expense, legal and other professional fees, geological and geophysical expenditures and the cost of roads, as well as the proverbial "kitchen sink."

This section goes on to say: (1) This privilege is not limited just to corporations in the oil and gas business but also to mining corporations and associations, partnerships and syndicates whose principal business is in oil and gas. It thus excludes individuals and all those whose principal business is not oil and gas. (2) It limits deductions with respect to land cost to \$1.00 per acre per year, except where such land costs consists of bonus payment to a government of Canada or the government of a province and the land is subsequently surrendered to that government.

#### **DEPLETION ALLOWANCE**

In other words, in the oil business, bad deals are deductible for tax purposes. And, as further encouragement, (as will be explained) profits from good deals may be taxed at approximately two thirds of the regular rate.

My last statement refers to an allowance commonly known as a depletion allowance. Section 11 (1) (b) of the Income Tax Act provides for a deduction in respect of an oil or gas well as is allowed to the taxpayer by regulation. The Regulations, Part XII provide an allowance of 33 1/3 % of oil and gas profits after the deduction of all costs permitted to be deducted under Section 83A.

In other words, after computing income on a "cash receipts and disbursements" basis, if an oil company has taxable income, only two thirds of such income is taxable—or to put it another way presumably to provide for land cost whether or not there was any. An oil company is taxed at two thirds of the normal rate of tax, which for all practical purposes is 31 1/3% compared to the usual 47%.

As previously stated, this allowance is commonly referred to as depletion allowance—and like the United States of America, but unlike most other countries in the world<sup>3</sup>—this allowance is *not* related to cost—i.e. it goes on as long as there is income—the cost is immaterial. The depletion allowance in the United States is based on the value of the oil or gas at the well head. The Canadian allowance is based on net profits. The relative merits of the two methods of depletion have been and no doubt will be the subject of a great deal of discussion.

Perhaps I should say however, that although the United States rate of 27 1/2 % of the value of production at the well head at first glance would appear to be a much more generous allowance than the 33 1/3% of the net profit permitted in Canada,

<sup>2</sup> Any reference herein to the Income Tax Act is to the *Income Tax Act*, Revised Statutes of Canada 1952, Chapter 148, as amended to and including November 30, 1958. Any reference to the Income Tax regulations is to the Income Tax Regulations established under the Income Tax Act up to and including November 30, 1958.

<sup>3</sup> The Federal Revenue System: Facts and Problems, Materials assembled for the Subcommittee on Tax Policy by the Subcommittee Staff, Joint Committee on the Economic Report, p. 38 (United States Government).

the fact that the United States law is not as generous as Canadian law with respect to special allowances may be considered to offset this difference, e.g. United States law requires the capitalization of part of productive land and well cost and accordingly requires more depletion allowance to absorb it.

During my attendance at the Massachusetts Institute of Technology<sup>4</sup> in Boston, I made a comparative analysis of tax incentives offered by the United States and Canada and came to the conclusion—"in view of the basic differences in the two tax systems, and the approach to the problems of depletion and special allowances as well as other factors considered, no general statement can be made that the United States offers greater over-all incentives to the oil and gas industry than does Canada".<sup>5</sup> Some illustrations given later in this article will substantiate this statement to some extent.

#### **DOES CANADIAN LAW FAVOUR U.S. INVESTOR?**

Newspaper headlines are often seen to the effect that our tax laws favour the United States investor. We can easily believe this. Many of our new residents are "Americans." We often hear that we have an unfavourable trade balance with the United States. We know that we must either import capital or sell to the United Kingdom or some other country for United States dollars to make up the difference. And it seems reasonable that we would favour the United States investor in order to acquire these very necessary "Yankee" dollars. But oddly enough, our tax laws do not favour Americans. Canadians, Americans, Englishmen or Russians are all subject to the same income tax law in Canada. The difficulty arises from discrimination by the Canadian Government against Canadian taxpayers.

The United States law makes its special deductions available to all United States taxpayers equally. In Canada we have created a group of special privilege—an aristocracy so to speak. To refer to Section 83A again—A corporation, association, partnership or syndicate whose principal business is the production, refining or marketing of petroleum, petroleum products (or mining) may make certain deductions—i.e.—only those whose principal business is the oil business may make the deductions. The United States also has its oil millionaires, but unlike Canada, it extends the opportunity to all residents equally—for example:—

Bing Crosby, who may or may not be in the 90% income tax bracket (the top rate in the United States)—but let us assume for the purpose of this example that he is, may decide to risk part of his income in drilling an oil well. If he does he can use such expenditure in the same way that an oil company does, to reduce his taxable income in the United States. He in effect spends 10¢ dollars while a Canadian in a comparable position spends 100¢ dollars.

The United States people are subsidizing the search for oil anywhere in the world. The subsidy is available to any United States resident willing to risk his taxable income. Canada also subsidizes the search for oil, but the subsidy is limited for all practical purposes to integrated oil companies and successful mining and drilling companies making such expenditures in Canada. A Canadian individual may not

<sup>4</sup> Sloan Program 1956-1957.

<sup>5</sup> Tax Incentives in the Oil and Gas Industry in Canada and in the United States (A Comparative Analysis) Byron Chester Tanner published by Gairdner & Company, Toronto, for distribution to clients).

even deduct his share of a loss incurred by a syndicate or partnership against the profit from another syndicate or partnership.

The Canadian government had excellent arguments to support this policy when it was instituted. It seemed reasonable that those presently engaged in the business were the logical ones to carry out an oil exploration program. To extend such tax concessions to other wealthy Canadians might represent a serious drain on tax revenues. Personally, I think it is time that the government reconsidered its policy, but I hope I have made it clear that our laws do not favour United States companies as such—the discrimination is in respect to types of Canadian taxpayers.

#### **U.S. AND CANADIAN TAX LAWS COMPARED**

There is another factor in the Canadian Tax Law which, when combined with Section 83A, might prompt one to think there may be a tax leak in the oil and gas industry. Let us compare the fortunes of oil operators "X" and "Y" conducting simultaneously the same oil exploration program in Canada and in the United States respectively. It is possible, new as the oil industry is in most parts of Canada, that it is less expensive to find oil in Canada than in the United States; but for the purpose of this example, we assume that the results are identical.

The following figures are taken from an example of a typical exploration program submitted by a major Canadian oil company<sup>6</sup> in a submission to a royal commission to show Canadian Tax Laws applicable to oil companies are less generous than United States Tax Laws. The following results were indicated after 15 years of operation:

Producing oil wells—130

Reserves of oil in the ground—960 million barrels

Profit—\$206.6 million

A calculation of tax payable on the \$206.6 million of statement profit when operations are carried on in the United States indicates taxable income of \$1.4 million, on which a tax of \$400 thousand is payable.

The comparable figures for Canada on the same \$206.6 million of statement profit are, taxable income of \$69.3 million and tax payable of \$32.6 million—\$32.2 million more than the tax payable in the United States and indicating that Canadian allowances are not as generous as the United States allowances. But, let us look a little more carefully.

Assuming we accept the \$206.6 million reflected in the financial statements issued to the public as the profit, what is the rate of tax applicable to each of these operators?

In Canada \$32.6 million tax on \$206.6 million represents a rate of tax of 15.8%. In the United States, \$400 thousand tax on \$206.6 million represents at rate of .19%—less than one fifth of 1%. These rates of 15.8% and one fifth of 1% compare quite favourably with the regular rates of 47% in Canada and 52% in the United States.

However, let us take another look. By preparing a statement of source and application of funds, and assuming an ability to borrow a maximum of 10¢ per barrel on oil in the ground, a conservative estimate, this program can be carried out with an investment of \$20 million.

<sup>6</sup> *Prospects for Canada's Oil Industry 1955-1980*. Imperial Oil Limited, December, 1955.

But suppose "X" and "Y" decide to sell their interests and wind up their companies. In Canada earned surplus account stands at \$206.6 million, less \$32.6 million in taxes or \$174 million. But what about the reserves of oil in the ground not included on the balance sheet or in surplus account? Well let us suppose for the purpose of a quick sale they each sell for a dollar a barrel<sup>1</sup>.

In Canada such a sale results in a capital profit. However, on winding up, tax must be paid on earned surplus as computed for tax purposes of \$69.3 million, less \$32.6 million tax paid, leaving a balance of \$36.7 million. This may cost if full advantage is taken of the 20% depletion allowance, and the 20% tax credit, and the 15% tax on undistributed income, about \$12 million—So what is left?

	CANADA	UNITED STATES
<i>Investment</i> .....	\$ 20	20
<i>Sale of oil reserves</i> .....	960	960
<i>Surplus</i> .....	207	207
	<hr/>	<hr/>
	1,187	1,187
<i>Earned income tax</i> .....	33	—
<i>Capital gains tax</i> .....	3	240
<i>Personal tax</i> .....	9      45	237      477
	<hr/>	<hr/>
<i>Balance</i> .....	<hr/> \$1,142	<hr/> 710

In the United States the company pays a 25% capital gains tax on the sale of oil reserves and "Y" a 25% tax on distribution of surplus. However, "X" in Canada receives back \$1 billion, 142 million from his Canadian operation or \$432 million more than the \$710 million "Y" nets from his United States operation because of the capital gains tax. In such circumstances, it appears that it would pay to be a Canadian resident subject to Canadian taxes.

In the first instance, it appeared that (although the rate of tax in both Canada and the United States was low compared to the tax paid by other industries), the United States rate of less than one-fifth of 1% was more favourable than the 15.8% rate payable in Canada. It now appears that taxes of \$45 million on \$1 billion, 167 million or approximately 4% for Canada compare quite favourably with the 41% or \$477 million payable in the United States on the same return of \$1 billion, 167 million.

It is difficult to draw conclusions—so many examples, yielding so many answers can be examined. In handling the sale in the United States, "Y" might have reduced his tax by selling the shares in his company, which is the normal way of realizing such profits in Canada or the United States. However, the example has indicated how it is possible if you are engaged in the oil industry to realize substantial profits on which very little tax is payable in Canada.

In addition, in the case of an integrated oil company having substantial refining and marketing income, it may be said that the government may, (by way of tax relief), in effect subsidize an exploration and drilling program to the extent of 47¢ of each dollar spent. Frankly, and honestly I recommend as an investment the common shares of any integrated oil company operating in Canada that has good management.

<sup>1</sup> (Oil is easily worth \$1 a barrel in the ground) Joint Committee, etc. (see footnote page 42 of thesis).

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# COST REDUCTION THROUGH COST ANALYSIS AND METHODS IMPROVEMENT

*By T. L. Carroll,  
Chief Industrial Engineer,  
Columbia-Geneva Steel Division,  
U.S. Steel Corporation, San Francisco.*

A recognized pathway to cost reduction is through methods improvement. In this article, the author relates how cost control and analysis can be helpful in guiding the intelligent application of methods improvement to many important cost problems and describes the process of training supervisors in the method as practised by his company.

**C**OSt reduction is of prime interest to any manufacturing business which aspires to continuing success in the competitive market it seeks to serve. To such an organization the subject of cost reduction is always timely, particularly important, and of necessity—interesting.

The management of a business may all too frequently be epitomized by the "do-good" phrase of "let's all work together and reduce costs." This may be called a cost reduction program in such a business. It is good as an ideal, just like being against sin or higher taxes. However, if such a program is to achieve results, it must be more specific—for instance, "what sin" and "which taxes" are we to eliminate. Tax reduction, for example, may only be brought about by carefully thought out consideration of each specific tax situation independent from the general tax level and tax problem. So it is with cost reduction.

## THE STANDARD COST SYSTEM

It has been recognized that cost reduction may be realized through methods improvement. How cost control and analysis can be helpful in guiding the intelligent application of methods improvement to many of the really important cost problems will be demonstrated in the following pages. Since cost control and analysis may be related as important to methods improvement, it may be advisable to touch upon the major features of the standard cost system to indicate its usefulness to methods improvement.

1. The standard cost system is essentially a system of predetermined costs based upon carefully engineered basic standards. These basic standards are subsequently evaluated at standard prices, and reflect the optimum usage of the quantities of men, machines and materials required in the manufacture of a unit of product in a given amount of time, under prestated conditions and standard operating methods.

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Chief Industrial Engineer for Columbia-Geneva Steel Division of U.S. Steel since 1947, Mr. Carroll graduated ten years earlier from the University of Santa Clara with a bachelor's degree in electrical engineering. During the course of his engineering career, at first with General Electric Company and later with Columbia Steel, he took advanced study in business administration, production planning and industrial engineering in New York, Pennsylvania and California. Since joining Columbia Steel in 1941, Mr. Carroll has progressed through various senior positions in the California and Utah plants and is presently based in San Francisco. He is a member of the American Management Association, the American Iron & Steel Institute, and Vice President in the San Francisco Chapter of the Society for Advancement of Management.

2. This system or method fixes responsibility for cost performance in each segment of the operations, by each element of expense. (Such as, materials, labour, repair and maintenance, tools and supplies, fuels and utilities, services, and various items of fixed and overhead expense.)
3. Use of predetermined costs by product and operating unit responsibility permits forehand budgeting and control, also "flags" differences between standard and actual costs (variances) thereby promoting management by exception. Also, the detailed construction of the standards permits determination of the cause of unfavourable cost results.
4. The costing system is constructed upon sales forecasts of normal volume and normal mix of product. This feature eliminates the undesirable influence of mix and volume from the measurement of true operating performance. However, separate measures of the cost impact of actual departures from expected "normal" volume and mix are provided.
5. Recognition of fixed and variable expense is established so as to provide proper treatment of their dissimilar behavior at varying levels of activity.

#### **METHODS IMPROVEMENT BASED ON COST SYSTEM**

Thus, the standard cost system provides the following vital information for methods improvement:

1. Knowledge of *where* cost performance is poor, and in *what* amount compared to standard performance.
2. Knowledge as to *who* is responsible.
3. Knowledge as to *why* costs are unsatisfactory, which determination leads to—
4. *How* costs may be improved.

This is the kind of information needed to facilitate the best application and use of methods improvement activities. It points to where improvement is needed and evaluates the relative need to improve, thus singling out important things for first attention. Also, since the cost system can be used to determine the absolute amount of cost involved in any element of cost, it identifies the more fertile fields wherein the greatest potential for improvement exists. It is clear that analysis of such cost information will develop the attitude of problem awareness in the management group. Once this attitude has been developed, attention can be directed to the utilization of a management tool that greatly assists the attainment of cost reductions. I am referring to "methods engineering." United States Steel Corporation has approached this activity through two avenues:

1. Methods engineering as practised by industrial engineers, who make full use of all techniques designed for this purpose, working in a cooperative manner with other departments such as engineering, line operating, metallurgical and maintenance.
2. Methods improvement by supervisors.

#### **A METHODS IMPROVEMENT PROGRAM**

In the latter case, a substantial contribution has resulted from training supervisors in methods improvement work. The industrial engineering techniques for methods engineering studies are complex and detailed, and more appropriately fitted for

use by specialized staff engineers. Therefore, these engineering techniques are generally not well suited for application by supervisors. The training given the supervisors is the systematic approach to solving problems of operating practices and methods. Such an approach is important, since experience has demonstrated that a systematic exploration for the "best way" is more dependable than haphazard inventiveness or cleverness.

United States Steel's procedures for training supervisors in methods improvement are designed to utilize the wealth of experience and knowledge possessed by the members of management. Our management group is large. We are convinced that one of the most important ways to lower costs, and hence improve our profit position, lies in directing the extensive knowledge and experience of this group to finding ways of making better use of the facilities we now have.

### **NEED FOR SYSTEMATIC APPROACH**

Just what is meant by methods improvement? "Methods improvement" means simply "finding better ways of doing work." It may also be defined as doing a better job with the facilities we now have. The result we are seeking is to obtain the best method to perform each operation with maximum safety and at the least cost, with existing facilities. This is accomplished when the use of equipment, materials and man power is properly in balance.

How can this balance be accomplished? It can be accomplished if a systematic analysis is made of each operation.

### **THE SYSTEMATIC APPROACH**

What is meant by this systematic approach? It is a simple five-step plan to:

1. Select the operation for improvement.
2. Get the facts by breaking down the operation into detail steps.
3. Analyze the facts by questioning every step.
4. Develop a new and improved method.
5. Install the new method.

It should be emphasized that this systematic approach is a practical tool which any supervisor can use and apply to improve methods in his department.

### **SELECTING AN OPERATION FOR IMPROVEMENT**

Now that the five steps of the systematic approach have been stated, let us dig into the first point—Select the Operation for Improvement—and see why it is important.

The use of a cost system and of cost analysis to isolate situations of unfavourable performance and their causes provides a proper basis for making good selections. Usually there are too many situations where cost results on individual items of expense do not meet standard performance. Obviously, however, if each of these many cases were tackled on an individual basis, the job would become cumbersome and get out of hand. There would be no time left for supervising operations, and staff forces, of necessity, would become unjustifiably large and costly.

The idea, then, is to select items of real significance—places where the total money involved indicates great potential for cost reduction, or where costs are running substantially above standard.

When selecting an area or item of expense for improvement it must be remembered that the single occurrence of large differences between standard and actual costs may represent a one-time fluke easily explained by unusual circumstances. A continuing trend of significantly unfavourable cost performance spotlights the imperative need for improvement.

Incidentally, it should be noted that a standard cost system and analysis of cost results provide a sound basis for testing the reasonability of both standard and actual costs on similar operations throughout the various plants, departments or operations of a company. This type of analysis where multiple, similar operations are involved may also be helpful in selecting operations for improvement.

In a like manner, the costs and sales prices attained by competition may point the way to good selection; at least the need to improve is most effectively demonstrated. Improvement here is a must, otherwise the business is lost to competition or becomes unprofitable.

The supervisor is quick to note re-occurring problems in his department which prevent him from realizing the cost results he wants and knows should be possible of attainment. These problem situations also can guide the selection of operations requiring improvement.

Clearly, in any of the situations described, the proper rule is to look for the important things first. Some of the typical cases with which, unfortunately, management is confronted all too often are illustrated in Exhibit 1. The main point to be stressed is the need to develop an awareness which promotes ready recognition of the methods and operating problems which are *always* present.

#### **GETTING THE FACTS BY BREAKING DOWN THE OPERATION**

The next, and second, step in the systematic approach to methods improvement is to get all the facts of each problem.

Analysis of the detailed cost system results and of related statistics will prove helpful in determining the causes of poor performance. However, if this technique is used alone, there is a possible hazard of missing physical aspects of the operation which may bear importantly upon the problem. Accordingly, to get all the facts, it will be necessary to break down the operation.

Just what is meant by a breakdown of the operation? A breakdown is simply a step-by-step listing in sequence of each task performed in the operation. Now we can ask ourselves, "Why is this necessary? Why not just go ahead and try to work out a better way after looking the operation over?" The answer is that men have always found it necessary to get the facts first, in order to improve old ways. A detailed breakdown does these things:

1. It insures getting all the facts on the present method.
2. It helps analyze the job in proper sequence from beginning to end—in the order in which it actually happens.
3. It helps you to examine the operation one step or one part at a time.

This is the kind of help most people need. The way to solve problems is one step at a time, to insure seeing the whole problem, not just a part of it.

The Methods Improvement Worksheet, shown as Exhibit 2, is an example of a simple form of breakdown of a typical steel mill operation.

To ensure satisfactory results, it must be stressed that the method used in making the breakdown is to:

1. Observe the operation on the job.
2. Make a brief statement of each step.
3. List all steps in sequence.
4. Indicate what is done
  - where it is done
  - when it is done
  - who does it.

The main pitfall in making a breakdown is to not get enough facts. The breakdown may be too skimpy. Steps may be omitted. It should be noted how the second column in the Method Improvement worksheet can be used to identify and emphasize pertinent facts such as distances, time, working conditions, hazards, excessive walking, number of men, etc.

#### **ANALYZING THE FACTS**

The next step in the systematic approach is to "analyze the facts." By this we mean, "To question each step" shown in the breakdown.

The first question to be asked is, "Why is the operation as a whole necessary?" This is the "big why" and should be asked before the steps are questioned. If it is determined that the operation is necessary, then "Why is it necessary?" should be asked about each step. Does the step have any purpose at all? It is necessary to distinguish steps that are needed from those that are unnecessary or doubtful. The "why" question provides information that sometimes leads to elimination of steps and consequently improved methods.

The next questions that should be asked when analyzing the facts are "Where should it be done?" and "When should it be done?" The answers to these questions taken together often lead to combining steps. A good deal of imagination is sometimes required to see the possibilities of changing the place or sequence. A sketch of the operation together with the breakdown listing the sequence of the steps is particularly helpful in many cases for gaining a clearer picture of the place and time problem. Once the operation is thoroughly understood it is very probable that it can be improved by changing the location or sequence thereby leading to combination.

Next, the question of "Who should do it?" should be asked. This question helps us to think about who is the most logical person to perform each step. Who else might do it because he is near by or has the time? It has been found that one man can help another by utilizing idle time. In asking "WHO?" thought must be given to redistribution and combination of work duties—so that man power may be utilized more effectively.

The final questions to ask when analyzing the facts are "How should this be done? Is there a better, easier way? Have new methods been used in similar operations that would be a help here? Would redesigned or new equipment help improve the operation?" Sometimes new equipment is indicated; however, it is better to look for ideas that do not involve capital expenditure in order to make the best possible use of the equipment available.

The purpose of asking the *Why? Where? When? Who? and How?* is to challenge the present method, step-by-step. Thorough questioning of every fact will yield a worthwhile return in the form of ideas. One cannot tell beforehand which fact or which question is going to generate the best idea. Emphasis here is on the need to approach each detail of an operation with a questioning attitude. One must be open-minded and study the facts carefully.

In the illustration of the breakdown for the operation of "Loosening Bottle Top Mold Caps," several worthwhile ideas could easily be developed by questioning each step. In effect, the questioning or analysis of each step of the operation will add to the facts on hand.

#### **DEVELOPING THE NEW METHOD**

The next step in the systematic approach can now be taken, which is to "develop the new method."

Exhibit 3 lists—opposite the steps taken in the systematic approach—typical actions which result from questioning *Why? Where? When? Who? and How?* For example, elimination of procedural steps occurs with surprising frequency; in many cases combination of actions, changes in location or sequence, reassignment of duties are found to be desirable to improve the method under study.

Only through asking these questions and seriously seeking logical and practical answers to each can usable ideas for new methods be generated in worthwhile quantities.

Results are not accomplished by inspiration in the usual sense, but rather by systematic stimulation of inherent creative ability. The simple operation previously illustrated after extensive questioning led to a new method, which is shown in Exhibit 4.

As you will note, additional questioning was made of the improved method with the thought of making further improvements. There is no method or process so good that it cannot be improved if the will to improve it is sufficiently strong.

#### **INSTALLING THE NEW METHOD**

The final and most important step in the systematic approach is to "install the new method." There is nothing that can be gained by any improved method until it is installed and working. Delay in installation of improved methods will result in lost benefits that can never be regained.

Installation of a new method is not an easy process. There are many problems that must be overcome. Obviously, there are new wrinkles that must be proven and worked out. There is need for good planning to make constructive action possible and to avoid problems resulting from hasty action. It may be profitable to cite a few considerations which are involved with the installation of a new method.

1. The proposed method must be laid out carefully so the others involved can understand what is proposed.
2. It will be important to check the effects upon safety. Is the new method a safe practice?
3. The question of costs must be answered. Will the new method actually reduce costs?

4. Similarly we must be confident that product quality standards have been maintained.
5. It will be necessary to determine the possible effects on related operations. Frequently, a change in one operation will require a revision of other operations.
6. It is particularly important to be alert to the possible effect of the new method upon administrative matters involving rates of pay and personnel problems. Therefore, we must check the impact on wage classifications, wage incentives, personnel moves, labour agreement provisions and employee attitudes. Staff assistance is very often required when the above points are checked.

It must be emphasized that employees' attitudes regarding changes deserve the utmost consideration in careful and thoughtful attention. It has been claimed that people resist change and are prone to view new ideas with suspicion and distrust. On the whole, our experience has been that this is not true. People actually like change and new ideas. However, people do not react favourably to things that are thrust upon them. It will be important, therefore, to encourage participation and suggestions when developing an idea. Most of us are inclined to accept new ideas when we are made a part of the idea's development or application with full understanding of all its facets. The matter of attitudes is most important and it should be stressed once again, since it is so involved with the successful selling and adaptation of ideas.

#### **RESULTS OF SUPERVISORY TRAINING**

The management of the United States Steel Corporation was convinced that substantial benefits could be derived from thorough training of supervisory and staff personnel in standard cost control and methods improvements. Formalized, comprehensive training arrangements were developed, therefore, covering these subjects. All management employees participated in these extensive training sessions which included individual and group "work-shop" development of improvements to typical steel mill case examples and problems.

To say the least, results have been most gratifying. Training in the use of the standard cost system developed greatly improved understanding as to what factors were influencing cost results and why. The more skilled analysis of cost data which resulted from this program served as the basis for each supervisor to use in detecting trouble spots. Methods improvement training has made more effective use of supervisory "know-how" in bringing about the necessary improvement to trouble spots.

The application of the techniques of the systematic approach to improving methods has been successful. So successful, in fact, has it been that recently these techniques have been incorporated into a training program called "Value Analysis," a cost reduction tool covering purchases which complements the Methods Improvement Program.

The Methods Improvement Program was designed to find better ways of using existing facilities. It deals specifically with better ways of doing "things" and was established to eliminate the ineffective use of man power, bottleneck situations, excessive delays and difficult working conditions.

The Value Analysis Program, on the other hand, was established to improve the value received for dollars spent for purchased goods, services and materials. Value Analysis deals specifically with better ways of purchasing and using materials.

## **APPLICATION OF VALUE ANALYSIS TO PURCHASING PROBLEMS**

The systematic approach can be applied in determining if full value is being received for purchased goods, materials and services in the same manner as it was used in methods improvement. The following approach is used to analyze the value of purchases:

1. Select the goods, material or service to be analyzed.
2. Obtain the facts about the material.
3. Analyze the facts or function of the material.
4. Develop an application of an alternate or substitute material or design.
5. Place the new material into usage.

In this approach reference was made to "Function." "Function" is the key to analyzing values. It means these things:

1. What is the purpose of the material?
2. Why is the shape, size, grade, type, etc. of the material being used as it is?
3. When is it used and when is its use no longer required?
4. Who uses it?
5. How can it be utilized after it has served its primary function?

An analysis of this type will help reduce costs by finding alternate or substitute materials or designs for ones that have become established by patterns and habits of thinking.

While the full potential supervisory training in value analysis has not yet been reached, there is every reason to anticipate benefits fully as outstanding as those obtained with the Methods Improvement Program.

The steel industry of the United States did not develop the facilities to produce over 140 million net tons of ingots a year by chance. Much of the credit for this accomplishment must be given to the thousands of individuals employed by the steel companies who have been thinking and putting methods improvement into practice.

### *For further reading*

THE PLACE OF THE METHODS GROUP WITHIN THE ORGANIZATION, by J. Pelej, Journal of Accountancy, Dec. 1954.

CASES IN METHODS IMPROVEMENT: Mercury Division of Ford Motor Company, Factory Management and Maintenance, June 1955.

MORE WORK PER WORKER, by R. Moore, Business Management, April 1954.

## **PERSONALS**

H. L. SHARP was recently named Controller for all of Canada of Plymouth Cordage Co. Ltd., Welland, Ontario. Mr. Sharp is a member of the Niagara Chapter.

P. W. WRIGHT, F.C.I.S., R.I.A., of the Montreal Chapter, has been appointed Vice-President of Shawinigan Chemicals Limited. Mr. Wright, who is also a Director of the company, continues as Secretary.

JOHN SPEARING, C.A., R.I.A., has been appointed Treasurer of N. Slater Co. Ltd. Mr. Spearing is a member of the Hamilton Chapter.

# SELECT THE OPERATION TO BE IMPROVED



## BOTTLENECK SITUATIONS

Does one part of the operation limit the whole? Are before and after operations in balance? Are material handling facilities adequate?



## EXCESSIVE DELAYS

Are certain units always breaking down? Is production held up for lack of material? Can the men assigned do the job assigned?



## POOR MATERIAL UTILIZATION

Are yields low? Could better inspection improve the quality? Are the men careless? Are the materials right? Are the mill practices right?



## EXCESSIVE WALKING

Do men plan their work? Is the equipment laid out properly to minimize steps? Are materials available or is someone always hunting?



## DIFFICULT WORKING CONDITIONS

Are fittings, valves and controls located properly? What about the dirt, grease and heat? Are long rest periods necessary for the crews? Is there too much lifting?



## INEFFECTIVE USE OF MANPOWER

Are the men standing around while machines are working? Are work assignments planned and scheduled properly? Do men get in each other's way?



## HAZARDOUS CONDITIONS

Do your safety awareness charts point up a bad condition? Anticipate other trouble points . . . look and analyze so that men can work safely!



## HIGH MAINTENANCE COSTS

Are certain pieces of equipment always giving trouble? Are parts wearing too fast? Are too many tools and supplies used? Is maintenance scheduled properly?

## METHOD IMPROVEMENT WORK SHEET

DEPARTMENT OPEN HEARTH

NAME JOHN DOE

OPERATION LOOSENING BOTTLE TOP MOLD CAPS

DATE 10/2/54

PRESENT

BREAKDOWN THE OPERATION			QUESTION EACH STEP
DESCRIBE THE OPERATION BRIEFLY:		INDICATE: DISTANCES, TIME, WORKING CONDITIONS, HAZARDS, EXCESSIVE WALKING, NUMBER OF MEN, ETC.	
<b>WRITE A BRIEF STATEMENT OF EACH STEP IN THE OPERATION</b>			WHY IS IT NECESSARY? ELIMINATE. WHERE SHOULD IT BE DONE? CHANGE PLACE—COMBINE. WHEN SHOULD IT BE DONE? CHANGE SEQUENCE—COMBINE. WHO SHOULD DO IT? REASSIGN DUTIES—COMBINE. HOW IS THE BEST WAY TO DO IT? SIMPLIFY.
1	Walks to valve	30 ft.	Why? Valve nearer?
2	Turns on water	Water on platform	Who? Somebody else?
3	Walks to hose	30 ft.	
4	Picks up hose		
5	Cools five caps		
6	Lays hose down	Stream into pit	Why? Keep platform dry
7	Walks to valve	15 ft.	
8	Turns off water		
9	Picks up pry bar		
10	Walks to first cap	35 ft.	
11	Loosens five caps	Last cap sticks	Why? Cooled too many
12	Walks to valve	15 ft.	
13	Turns on water	Stream into pit	
14	Walks to hose	15 ft.	
15	Picks up hose		
16	Cools last cap again		Why? Got hot again
17	Lays hose down	Stream into pit	
18	Walks to valve	15 ft.	Where? Too much walking. Could valve be put on nozzle?
19	Turns off water		
20	Walks to cap	Waits for water to boil away—3 min.	
21	Pries last cap loose		
22	Returns pry bar	15 ft.	Total distance walked—170 ft.

## ANALYZE THE FACTS

<b>WHY</b>	<b>IS IT NECESSARY?</b> Should it be done at all? <b>WHY?</b>
<b>WHERE</b>	<b>SHOULD IT BE DONE?</b> Should it be done here or somewhere else? <b>WHY?</b>
<b>WHEN</b>	<b>SHOULD IT BE DONE?</b> Should it be done now, sooner or later? <b>WHY?</b>
<b>WHO</b>	<b>SHOULD DO IT?</b> Should these persons or others do it? Are others available? <b>WHY?</b>
<b>HOW</b>	<b>SHOULD IT BE DONE?</b> Should it be done as at present or another way? <b>WHY?</b>
<b>ELIMINATE</b>	
<b>COMBINE</b> <b>CHANGE PLACE</b> <b>CHANGE SEQUENCE</b> <b>REASSIGN DUTIES</b>	
<b>SIMPLIFY</b>	
 $A + B = D$   	
	

## METHOD IMPROVEMENT WORK SHEET

DEPARTMENT OPEN HEARTH

NAME JOHN DOE

OPERATION LOOSENING BOTTLE TOP MOLD CAPS

DATE 10/2/54

## PROPOSED

BREAKDOWN THE OPERATION		QUESTION EACH STEP
DESCRIBE THE OPERATION BRIEFLY:		WHY IS IT NECESSARY? ELIMINATE. WHERE SHOULD IT BE DONE? CHANGE PLACE—COMBINE. WHEN SHOULD IT BE DONE? CHANGE SEQUENCE—COMBINE. WHO SHOULD DO IT? REASSIGN DUTIES—COMBINE. HOW IS THE BEST WAY TO DO IT? SIMPLIFY.
<b>WRITE A BRIEF STATEMENT OF EACH STEP IN THE OPERATION</b>		
1	Capper picks up nozzle	
2	Walks to molds	5 ft.
3	Turns on water	
4	Cools three caps	
5	Turns off water	
6	Drops hose	
7	Gets pry bar	20 ft.
8	Pries three caps	
9	Returns pry bar	20 ft.
10		45 ft. = Total distance walked or 15 feet per cap
11		
12		as compared to 34 feet per cap
13		for present method.
14		
15		
16		
17		
18		
19		
20		
21		
22		

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